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POPULATION GROWTH AND INDUSTRIALIZATION *

prepared by
Pharmaceutical Industries Unit
Chemical Industries Branch
Division of Industrial Operations

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1. INTRODUCTION

The increase in the world population, which has reached almost 4.5 billion by 1981, is the result of accelerated growth rates in the developing region during the last forty years. The economic progress of these regions during this very period, although unprecedented in the history, was nullified to a substantial degree by this steep growth. The unwelcome effects of this increase were anticipated as early as the 1950s, and ever since efforts are being made to adopt measures to arrest this trend. Successes have been recorded and growth rates have also declined but it is apparent that the achieved decreases in population growth are still not adequate in the developing regions which represent almost three-quarters of the world population and are constantly menaced by poverty and ill health.

The two important events, the World Population Conference (Bucharest, August 1974) and the Second General Conference of UNIDO (Lima, March 1975), which provided great impetus to the United Nations activities, took place almost simultaneously. It was not a coincidence that these events took place within a short period but it was the need of time, bearing the same objective to draw up a global strategy within the framework of the propounded international relations called for under the new international economic world order.

Since that time and coordinating with the activities of the United Nations Fund for Population Activities (UNFPA), the United Nations Industrial Development Organization (UNIDO) has prepared two studies on evaluation of the influence of industrial development on different demographic variables.[1/] These studies offer in-depth analyses of interactions between development processes and socio-cultural aspects of human life and the resultant effect on demographic variables, in an attempt to explain the influence of industrialization as a dynamic force on the laws governing the structure and spatial distribution of the population. The present study is the extension of the same work in the light of more comprehensive and up-to-date data on world population trends and demographic variables as assessed in 1980,[2/] with a view to give a fresh look at the factors contributing to population changes with emphasis on factors related to industrialization processes, and to make an attempt to determine interrelationships which could be fruitfully employed in planning the structure of the world population.

1/ The Effects of Industrialization on Population, B.M. Grossat (UNIDO/IOD.13, March 1976)
Population, Economic Development and Industrialization (UNIDO/IO.384, October 1980)

2/ Demographic Indicators of Countries; Estimates and Projections as assessed in 1980 (United Nations, 1982)

In the present document attention is paid to the demographic variables which are considered to be more influenced by the process of industrialization in conjunction with recent demographic data, avoiding repetition of detailed discussions on basic concepts and theories which have already been dealt with in the previous UNIDO publications referred to earlier.

2. OBJECTIVES

The present study has been undertaken with the following objectives:

i. to analyze the effect of industrialization on four major demographic indicators:
   a. Mortality
   b. Fertility
   c. Urbanization and Migration
   d. International migration

ii. to evaluate the relationship between population trends and various social aspects:
   a. Food
   b. Education
   c. Health
   d. Employment and income distribution
   e. Status of women

iii. to propose plausible approaches aiming at effective population management

Keeping the above objectives in perspective, the study has been broken down into the following sections:

- the trends and projections of world population and industrial development:
- the effect of industrialization on major demographic indicators:
- socio-economic conditions and the population phenomenon;
- population planning concepts;
- population policies;
- conclusions and recommendations.

3. THE TRENDS AND PROJECTIONS OF WORLD POPULATION AND INDUSTRIAL DEVELOPMENT

3.1 Population trends

The population of the world has recorded phenomenal growth during the last three decades, reaching 4.5 billion in 1981 (Figure 1). This growth, however, has been registered almost entirely in the developing regions of the world and with varying rates even within the developing regions. One trend has definitely emerged and that the increases are generally inversely proportional to the relative development indices. Africa, for example, still at comparatively lower levels of development, has registered the highest growth while East Asia, leading other regions in development, has recorded significant decline.

Based on medium variant projections, world population is expected to reach 6.12 billion by the year 2000 and over eight billion in the year 2025. These estimates, in line with trends in the recent past, are based upon a steady decline in population growth rates down to 0.96 per cent annually by the year 2025.

Although tbe projected decline in fertility rates, especially in the developing regions, is significant, but the net annual increase in population will still be substantially larger as compared with corresponding figures of the preceding decades (Figure 2). In summing up the effect of this growth, the world food production will have to be increased to suffice for 3.5 billion extra people by the year 2025. The economically active population will reach five billion, for whom jobs will have to be found, almost exclusively in the crisis-ridden developing regions, which are already suffering food shortages and high unemployment.

3.2 Urbanization

High population growth in the developing regions was accompanied by even higher rates of movement of people from rural to urban areas, especially after the emergence of a large number of former colonies as independent states (Figure 3). The causes of this enormous movement could be more than one, but perhaps the major reason was the expectation of rural populations to benefit from the newly introduced national development programmes of the new states. The trend towards high rates of movement of rural population to urban centres seems to be of an unending nature and, as a consequence, has outstripped the infrastructural expansion of the urban communities all over the developing regions, leading to unemployment and its attendant miseries. This migration of rural populations to cities and towns has equally affected the rural areas by draining them of their younger and economially more active members.

FIgure 1

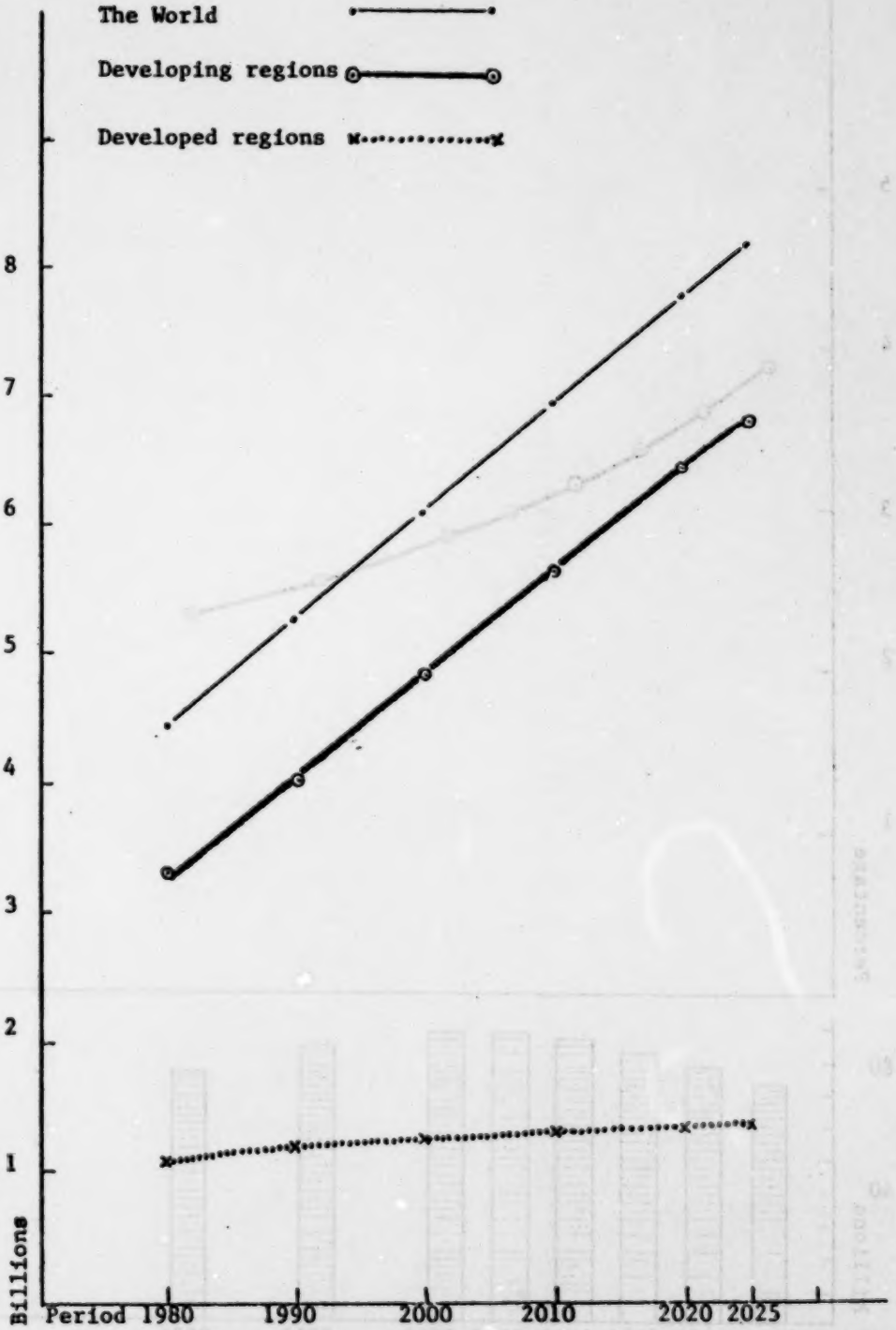


Figure: World Population Growth Trends
Source: United Nations, Demographic Indicators of Countries, 1982

Figure 2

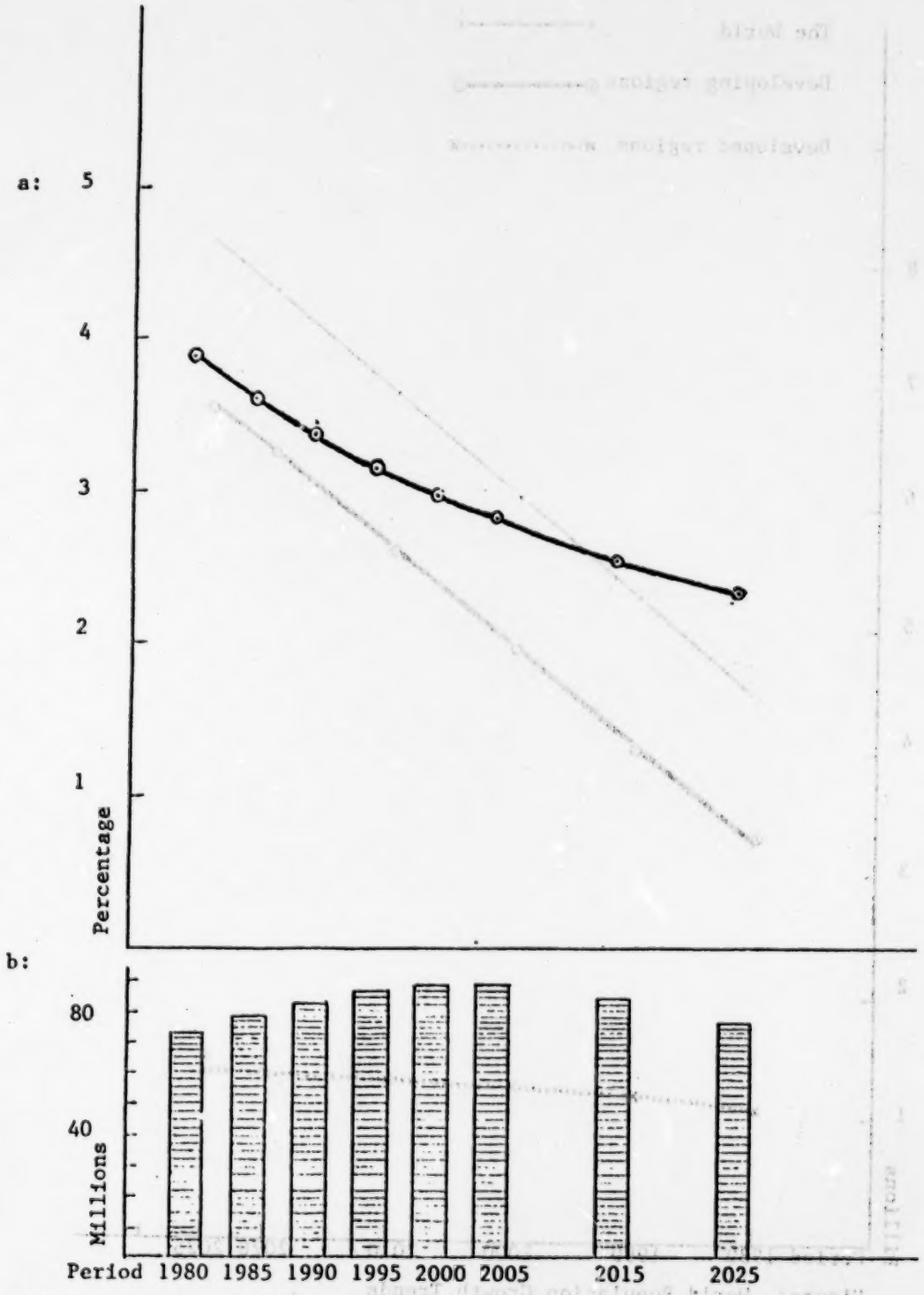


Figure: a: World Total Fertility Rates b: Population Increase

Source: United Nations, Demographic Indicators of Countries, 1982

In contrast with a steady decline in population growth, the process of urbanization is projected to maintain a high rate in the developing regions and as a result their present urban population of one billion is expected to double by the year 2000. With the trend continuing, urban growth in the developing regions is expected to reach over 60 per cent by the year 2025 as compared with around 30 per cent in 1980 (Figure 3).

3.3 Industrial development trends and effect of population growth on development indices

The post World War II era has experienced an accelerated rate of industrialization all over the world and during this period great advancements in technological development have taken place in the developed regions. Likewise, the newly emerging independent nations of the developing regions also embarked upon ambitious programmes of nation-building and due to the initially low industrial indices of these regions, were able to achieve unprecedented growth rates in the first two decades, considerably exceeding the levels achieved by the developed regions in the corresponding period, with improvement in per capita consumption, national savings and investments

GDP and Industrial Value Added Growth[3/]

		GDP		Industry VA	
i.	Developing countries	1960-70	1970-81	1960-70	1970-81
	Low income economies	4.6	4.5	6.6	3.6
	Middle income economies	6.0	5.6	7.4	6.8
ii.	Industrialized countries	5.1	3.0	5.7	2.8

Note: In the period of 1860 to 1938, the industrial growth in the West ranged between 2.2 - 4.2 per cent for "two decades" periods 4/

3/ World Development Report, 1983, pp. 150-151; World Bank

4/ "Rates of Industrial Growth in the Last Century - 1860-1958" Barry E. Supple (ed.)

The Experience of Economic Growth (case studies in Economic History), New York: Random House, 1963, p.72

Figure 3

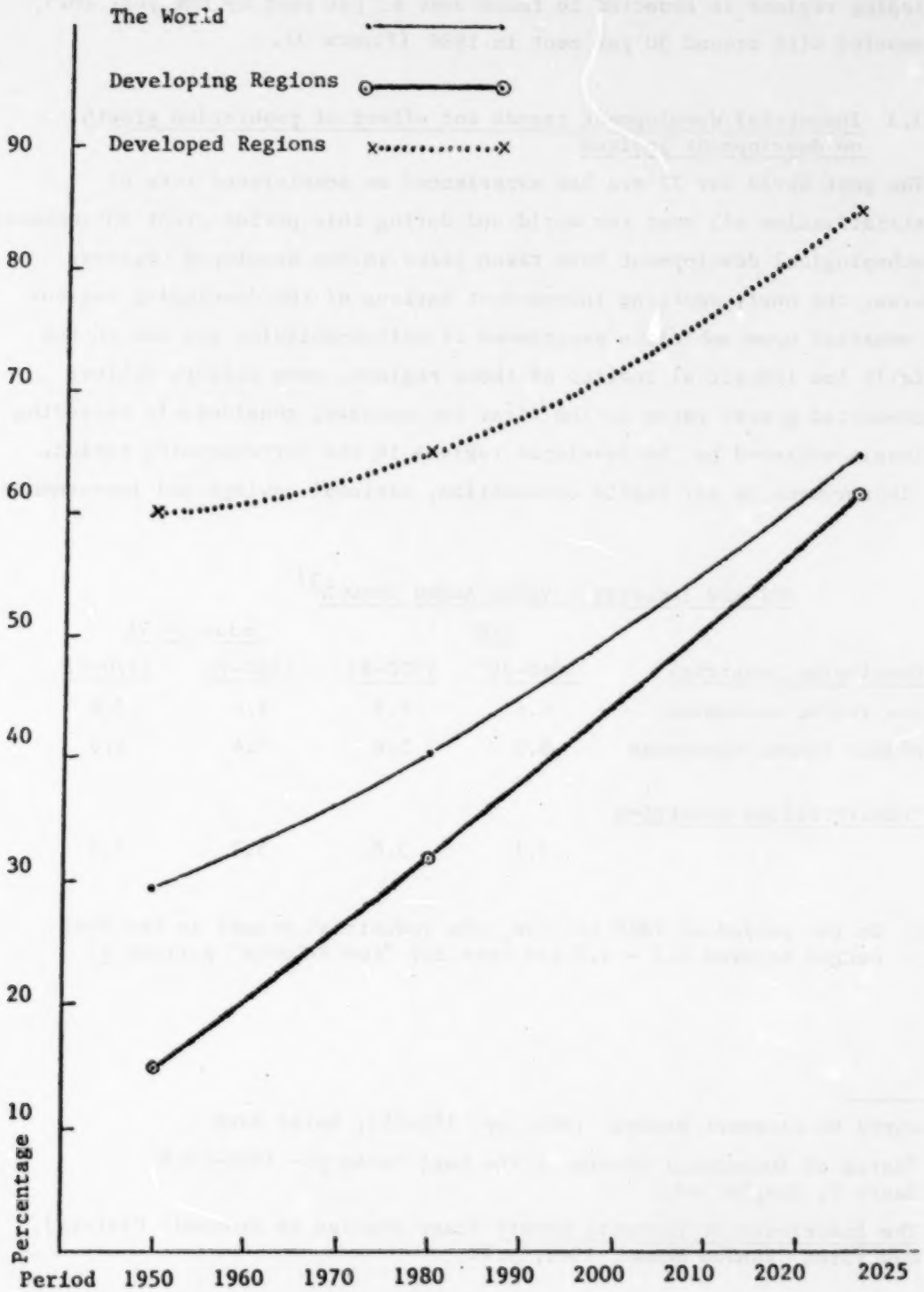


Figure: Urbanization Trends.

Source: United Nations, Demographic Indicators of Countries, 1982

This fast growth enabled the developing regions to increase their share in the global industrial output to 10.2 per cent by 1975 as compared with 7.3 per cent in 1953 (Figure 4). The benefit of such improvement, however, was considerably offset by the population growth, registering a record increase of almost 95%, bringing their share in the world population to 75 per cent as against 66 per cent held in 1950.

The situation in developing countries further worsened due to the economic crisis of the late 1970's when global industrial growth came to a stand-still, affecting development plans in almost all regions. The developing countries have been hard hit resulting in large-scale curtailments in their developmental programmes under obviously compelling economic circumstances, although the effects were not immediately experienced. These curtailments have also aggravated the ensuing recession in several major industrial sectors of the economies of developed countries pointing to the complementary relationship between the economies of the developed and developing regions and the necessity for a balanced economic world order.[5/]

This brief overview of industrial development indices and the adverse effect of excessive population growth on development, details of which can be extrapolated from numerous recent studies on the industrial development trends and the resultant effect in the developing regions of the world, clearly demonstrates that in spite of high growth in industrial indices, the gap in per capita GDP between the developing and developed countries still remains as wide as illustrated by the figures of US$ 300 in Southern and Eastern regions of Asia and US$ 9,000 in Northern America.[6/]

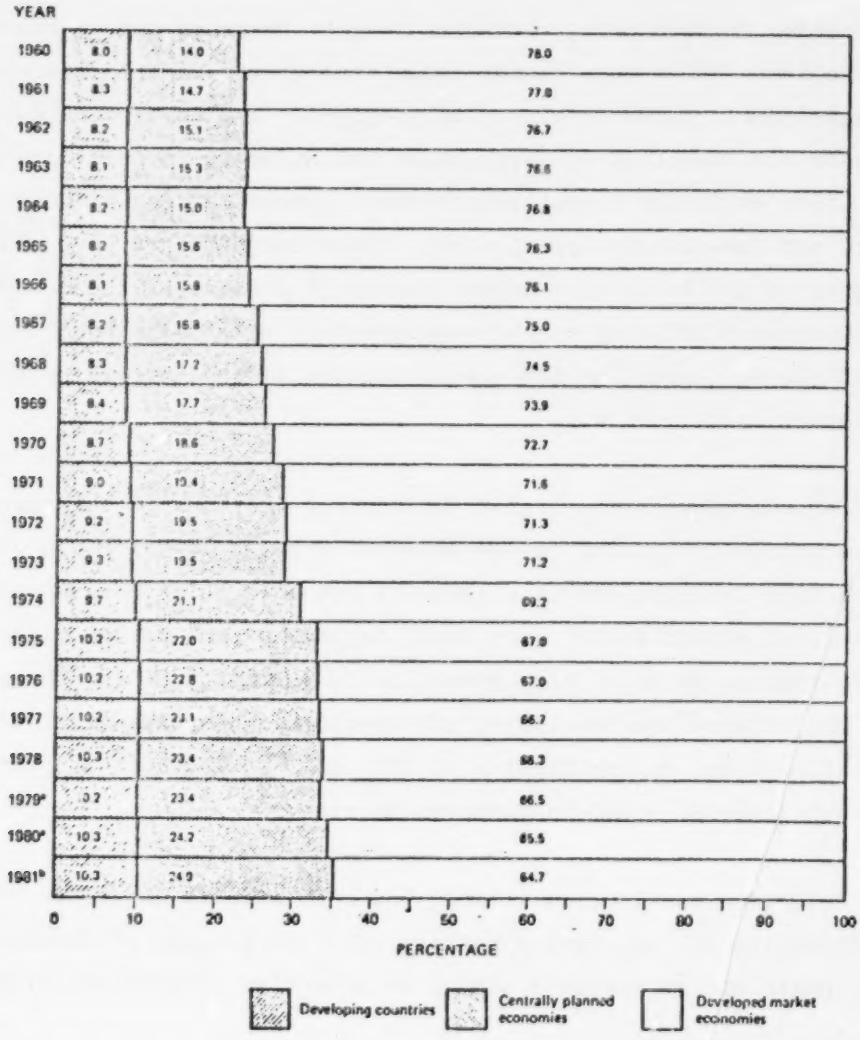
In the following section, an attempt has been made to correlate the major factors influencing the population pattern with the process of industrialization in order to postulate an approach aiming at effective population management.

5/ World Industry in 1980 (United Nations)

6/ Population, Economic Development and Industrialization, UNIDO/IO.384, 1980, p.11

Figure 4

Share of economic groupings in world manufacturing value added at constant prices, 1960-1981



Source: UNIDO data base; information supplied by the Office of Development Research and Policy Analysis and the Statistical Office of the United Nations Secretariat; and *Monthly Bulletin of Statistics*, vol. XXXV, No. 11 (November 1981), with estimates by the UNIDO secretariat.

Note: Percentages may not add exactly to 100 because of rounding.

[a]Preliminary figures.

[b]Estimates.

4. THE EFFECTS OF INDUSTRIALIZATION ON MAJOR DEMOGRAPHIC INDICATORS

Demographic variables such as mortality, nuptuality, fertility, urbanization, have often been linked with the process of industrialization which has been found a more practical statistical tool for measuring the population trends. In reality, however, the industrialization is a means, though powerful in the given set of conditions, inducing certain orientation in the structure of society which manifests new socio-economic trends leading to changes in the demographic indices. It, therefore, seems logical to analyze these influences on the individual demographic indicators.

4.1 Industrial environments and mortality

A marked decline in mortality rates has been recorded throughout the world during the last thirty years, the decline in developing regions being more significant. This can be explained by the fact that the major segment of the high mortality rates had been infantile and child mortality, which has been controlled better with the help of improved health care, para-medical assistance and better sanitation programmes.

In the initial period of economic development process, the indices of the stated mortality levels decline with increases in fertility levels resulting in population growth, but eventually the fertility rates also start declining resulting in gradual decrease in population growth - the phenomenon brought about by socio-economic transitions in the society.

Mortality rates are related to the general health standards of the population but the living conditions and work environments also have their contributory role. These influences can be classified further in specific risk groups. In a developing society facing nutritional problems and where health care and sanitation services have not been adequately developed, the risk of mortality amongst infants and young children, child-bearing age women and the physically handicapped is far greater than the adult population, even accounting for "work risks". Contrary to this situation, in a developed society, where these mortality risks have been greatly reduced in all age groups, the risks flowing from industrial environments logicaly draw more attention.

Technological development has always been associated with factors of risk related to industrial environments. Since the inception of civilization, the innovative sense of man has been instrumental in exploiting nature for his betterment and, for this purpose, tools of trade began to be developed. In the course of time, development of skills and tools led to the technological age. During periods of technological evolution, the human soceity has been subjected to increasing risks, often being unaware of the intensity of hazards these risks may cause to man. Human tragedies in mine accidents and chronic poisoning of arsenic and lead are only two of many such examples well known in the history of industrial development.

In more recent years, concern has been expressed again towards the grave consequences of the risk to human life and nature posed by the exposure to industrial environments:

- Industrial effluents and wastes have threatened natural fauna and flora
- Vast areas of ocean surface, coastline and rivers have often been polluted with industrial oils and other wastes
- Exposure to dangerous industrial materials has cause health problems
- Industrial accidents of varied type and intensity have often been fatal or a cause of permanent disability
- Industrial traffic and excessive mobility of people takes its own toll of life and cause proliferation of communicable diseases
- The stress and strain of modern life tends to add to the prevalence of nervous disorders

Modern development efforts may have ill effects on the topography also.

- Deforestation and resultant land erosion problem has frequently been the subject of serious discussions
- The threat to marine life is clear, as is the disruption of the eco-balance while certain marine species face extinction
- Excessive use of pesticides on food crops has caused universal concern
- Extensive harnessing of rivers for irrigation and energy has actually resulted in serious damage to farmland and neighbouring populations.

The risks to human life due to industrialization are there and will continue to exist but, at the same time, the advantages which can be derived from industrial development must be weighed against these risks which have the minimal contribution to total mortality.

The fact that in spite of comparatively much higher exposure to industrial environments, total mortality rates in the industrialized economies are much lower than in the rest of the world is, by itself, a convincing argument against the view that industrial development may be detrimental to society. The available knowledge and experience of measures now available for evasions of risks to human life and ecology attributable to industrialization, however, should be given due weightage in order to incorporate safety measures in the plans for industrialization and development. The developing economies are at a low ebb of industrialization and consequently the development plans can be appropriately developed to circumvent the anticipated hazards well before the establishment of industries particularly known to cause harm to the natural environment and habitat.

4.2 Industrial employment and fertility

The fertility rates amongst the industrially employed societies ultimately decline to such a significant degree that even the effects of reduction in mortality in the subject population are more than offset with resultant decline in population growth.

This phenomenon cannot be adequately explained merely in the perspective of the elimination of the fear of losing offspring and increased spacing between pregnancies due to reduced infantile mortality in developing societies. Reduced fertility can be explained better by the change in attitudes of life brought about through socio-economic changes in life style under the influence of industrial occupation and urbanized environments which may induce "reduced family size" considerations.

It is, however, necessary to give due weightage to the deep-rooted social and traditional approaches of newly developed societies which continue to play a dominant role against any changes leading to the awareness of controlling the size of the family. In developing countries, the urbanized section of population in reality remains an aglomerate of groups of people coexisting at different levels of social and economic development characterized by varying degrees of awareness towards economic consequences of excessive increase in population and consequently do not attach sufficient importance to the considerations of limiting the family size.

4.3 Urbanization and migration

The role of industrialization in encouraging urbanization has been observed in all economic and social orders, irrespective of the level of development. Economic policies encouraging the development of the industrial sector create urban matrices which continue to expand but, in developing regions such growth has been rather rapid and unplanned and far exceeding the economic growth. This phenomenon is vividly illustrated during recent trends observed in developing regions where the movement of people to urban centres has taken place at an accelerated pace. The cause of expansion of urban populations in preference over rural areas is the result of differential manpower demands but the continuing population flow has considerable economic consequences. The prospects of better wages, improved living conditions and a more respectable status have been some major determinants for the economically active rural individuals to continue to move into urban areas, even with the hazards of uncertain prospects. The natural increase in rural population in absence of parallel growth of agricultural occupation is also a contributory factor.

As a consequence of this uncontrolled movement a rather undesirable situation has arisen during the last three decades while the trend continues. The major reason for this trend appears to be the inherent weakness in the development process when, because of numerous uncontrollable factors, it was not possible to decentralize industries to avoid the formation of fast-growing conglomerates in limited locations and inadequacy of the rural development programmes. Consequently, this process has precipitated economic and social disarray within the developing countries, which on one hand has caused excessive drain of economically active population from the rural areas and on the other has burdened the urban development by heavy influx of people, causing noticeable deterioration of socio-economic structure both in the rural and urban sectors.

> The movement of people from rural to urban areas in the developing regions, therefore, cannot be considered as growth of true urban society

The process of urbanization tends to reduce fertility considerably but the case of urban populations of the newly developing regions cannot be considered parallel with that of developed societies because of variegated socio-economic conditions prevailing in the newly urbanized populations of the developing regions. The observed fertility rates of the newly urbanized populations with some exception, no doubt, are lower than those in the rural areas but vary considerably between different socio-economic levels.

The reduction in fertility rates amongst immigrant families, on the other hand again is, perhaps, more circumstantial because of physical separation of husband and wife rather than a change in attitude towards planned parenthood and reduced family size.

4.4 International migration

The flow of people from rural to urban areas is the result of economic disparity between two sections of the population, irrespective of geographical or political boundaries. When such a situation develops between two countries, the movement of people assumes an international character.

Preferential industrialization in developed economies, continuing for long, has resulted in two major "polarising" situations - that of extreme economic disparity between the developing and developed regions of the world and of increased manpower demands in certain developing regions with financial surpluses.

In the wake of changing economic and political structures in the past World War II period, when the West went through the industrial boom, large number of people of developing regions started moving towards the west with prospects of finding better means of earning. This movement was encouraged by the West also in order to meet the deman of increasing manpower, particularly in the unskilled and semi-skilled areas.

The high international migration of the 1950's and 1960's sharply declined in the 1970's (Figure 5) but the economic recession which set in during the late 1970's and has continued into the 1980's has precipitated a serious situation of human management problems due to unemployment both in developing as well as industrialized countries.

The ultimate decline in the rate of international migration has been brought about through stricter regulatory measures, being enforced in recent years in most of the West to curtail the flow, in response to the slackening of industrial activities with accompanying tendency of redundancies and unemployment.

Figure 5

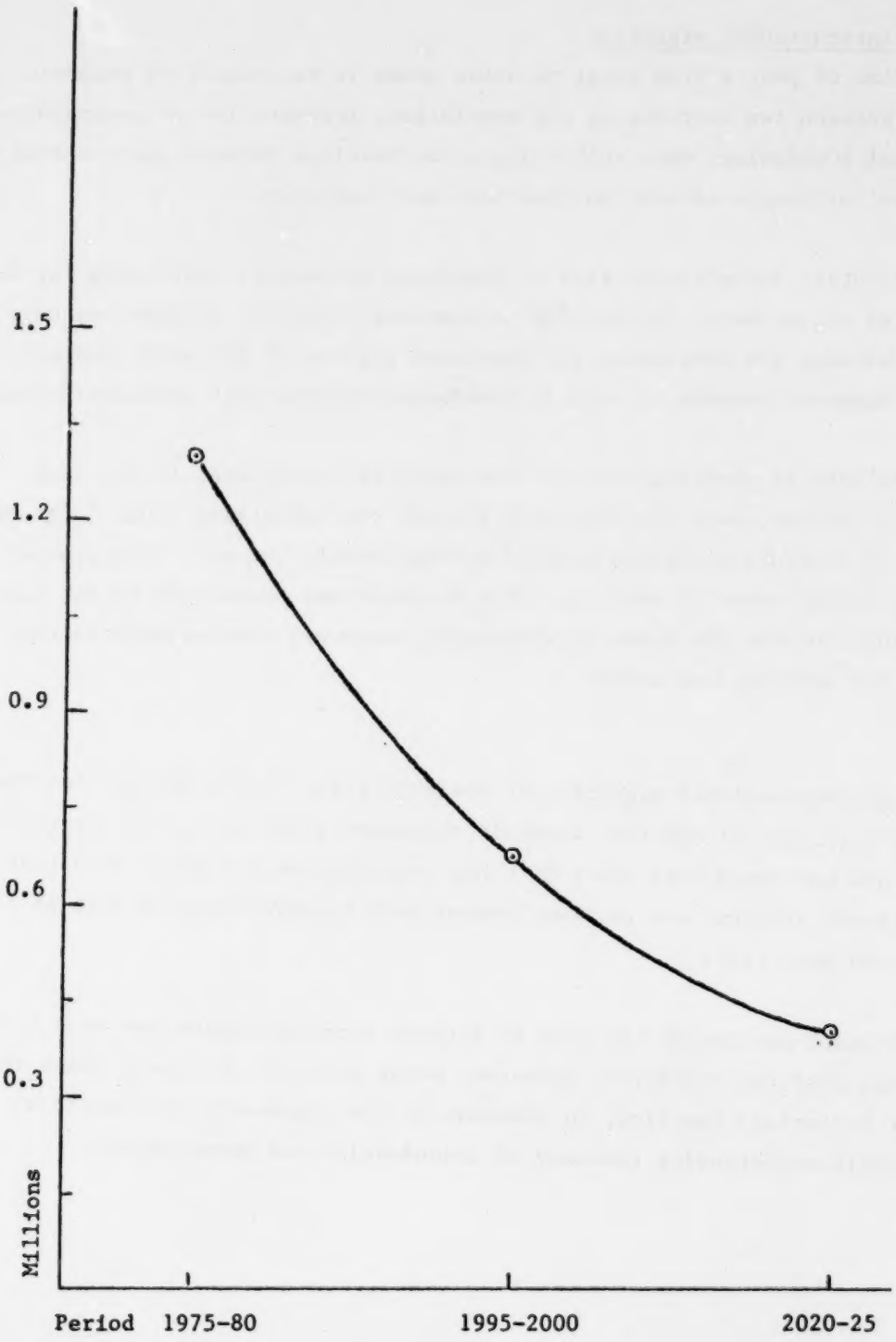


Figure: International Migration

Source: United Nations, Demographic Indicators of Countries, 1980

It is evident that this type of international migration has much in common with the movement of people from less developed rural to more developed urban areas within political units or developing regions, differing only in monitoring and control aspects which cannot be as easily instituted within the political unit.

5. SOCIO-ECONOMIC CONDITIONS AND POPULATION PHENOMENA

The population phenomena are closely linked with socio-economic and cultural environments of the society inducing complex interactions between these environments and demographic indicators. Under such complexities, it will not be realistic to try to analyze the population phenomena without due consideration to the socio-economic structure of the population under study. Any approach towards steering population behaviour through an emphasis merely on the economic aspects of a society would be an over-simplification of the situation and perhaps this is the reason for the rather limited success in the family planning programmes launched in the developing countries in recent decades.

In developing countries today, even the urbanized section which, in any case, is a small segment of the population, has not attained a homogeneous socio-economic character. Ethno-traditional unfluences still play a dominant role and the economic forces have not developed deep roots. This situation is not comparable with the West, where the socio-economic conditions developed steadily over a long period of gestation with sound and stable economic structures as illustrated by the fact that population growth rates in Europe have remained significantly lower since the early nineteenth century (Figure 6a) as compared with the rates in fairly developed economies of the East today (Figure 6b). Such behaviour can be explained only with reference to the effects of different socio-economic attitudes on fertility trends under widely diverse social orders.

It is of interest to observe here that during the early period of industrial evolution and economic development in the West, slow growth in population was not due to low birth rates as much as due to high mortality and perhaps in the subsequent period the declines in fertility rates remained proportional to the declines in the mortality rates, thus maintaining a low profile of population growth. In contrast with this, the trends in the developing regions in recent decades have been of steeper decline in mortality rates as compared with meagre reductions in fertility (figures a and b), obviously resulting in the so-called "population explosion".

Figure 6

Relationship of Population Growth with Birth Rates, Mortality and Urbanization

Country		Birth rate/ 1000	Mortality/ 1000	Population growth %	Urbanization %
a: Developed Countries (Industrial take-off period)[8]					
England	1800	35	23	1.2	
	1850	33	23	1.0	
France	1800	32	27	0.5	19
	1850	27	23	0.4	26
Japan	1900	35	21	1.4	16
	1925	33	19	1.4	30
b: Developing Countries[9]					
Mauritius	1980	27.3	7.8	1.95	52
Korea	1980	27.6	8.2	1.92	56
Sri Lanka	1980	27.6	7.6	2.01	27
Jamaica	1980	28.6	6.7	2.10	41
Malaysia	1980	33.1	7.9	2.52	56
Indonesia	1980	33.6	16.2	1.74	20
India	1980	35.5	15.1	2.01	22
c: Developing Countries with Medium Size Industrial Sector[10]					
Egypt	1980	38.4	12.8	2.56	45
Peru	1980	38.6	11.6	2.70	67
Mexico	1980	38.7	7.8	3.05	67
Pakistan	1980	43.1	15.0	2.81	28
Iran	1980	44.4	13.6	3.08	50

8/ Industrial take-off, W.W. Rastow, Stages of economic growth, Cambridge University Press, 1961, p.38

9/ 10/ Extracted from Demographic Indicators of Countries, Estimates and Projections as Assessed in 1980 (United Nations) 1982

The data offers another indication worth noticing, i.e. that the average birth rates in the West during the industrial take-off period were lower than those of newly developed countries of the East today (Figure 6a+ c) in spite of the present day prevalence and use of effective anti-fertility methods. The question whether the climatic conditions and racial characteristics also have any influence on fertility, however, remains unanswered. Extended studies of population trends may throw some light on this aspect in future.

The development of society evokes subtle responses in the socio-economic activities with economic values influencing the family life style. In a consumer society a change in family size is thus measured more in economic terms, and accordingly the concept of a small family size develops. Under variegated socio-economic environments, such as newly urbanized societies, however, the attitude towards a desirable family size, whenever develops, takes varying courses irrespective of economic development indices. These observations are substantiated through the recent population statistics of selected developing regions and countries with diverse socio-economic attitudes (Figure 7).

- One typical example is noted in the countries of Latin America, where, in spite of higher rates of female literacy and urbanization and a relatively wider use of contraception, total fertility rates are significantly higher than in Mauritius and Sri Lanka, taking the female work participation indices at more or less the same level.

- Asia, with a low degree of urbanization, education, and marriage age of women, and contraception practices, still has a lower fertility than Latin America.

- Africa, with a relatively higher percentage of working women than Latin America and South Asia, experiences high fertility.

- In the case of Jordan, on the other hand, in spite of a higher degree of urbanization and female work participation and almost the same degree of contraception practice, the fertility is much higher than in Indonesia.

Figure 7 COMPARISON OF DEMOGRAPHIC INDICATORS OF SELECTED DEVELOPING REGIONS AND COUNTRIES

Region/Country	Population (millions)	Female Literacy %	Female Work Participation %	Urbaniz-ation %	Female Marriage Age	Contra-ception %	Total Fertility
LATIN AMERICA	366	74	25	66.6	(22)	High	4.4
Mauritius	0.9	50	25	52.2		50	3.0
Sri Lanka	15.2	68	29	26.6	(25)	33	3.4
ASIA	2,608	39	49	28	(20)	Low	3.9
Latin America	366	74	25	66.6	(22)	High	4.4
AFRICA	486	17	40	28.8	(18)	V. Low	6.4
Latin America	366	74	25	66.6	(22)	High	4.4
Jordan	3.2	-	47	56.3		23	7.3
INDONESIA	148.8	45	33	20.2		28	4.1

Notes: Figures in brackets represent close approximations
Blanks indicate that data is not available

Source: Fertility and Status of Women, Population Reference Bureau Inc. Washington DC, 1981

A careful study of this comparative data, however, does allow one to draw a rather circumstantial conclusion that of all the contributory factors, the work participation of women, the female marriage age, and contraception practices, play a more significant role in reduction of fertility, assuming that education has its bearing on all these factors. As far as delayed marriage and female work participation are concerned, their responses are of an induced nature and are brought about through socio-economic changes in life style, but contraception practices are more voluntary in nature. It is, however, of relevance that contraception practice may not necessarily have a bearing on fertility as it may be intended for the purposes of merely delaying the pregnancy or for increasing spacing between the off-spring, without altering the desired final number of children.

There are two other factors which have often been reasoned out to explain the phenomenon of reduction in fertility in the developing urbanized societies:

i. Economic prosperity in the families of developed societies brings about changes in the attitude leading to a reduced family size;
ii. Reduction in infantile mortality under improved health conditions, when the fear of loss of a child is reduced, induces decline in fertility rates.

The arguments seems self-defeating in a sense that the newly gained prosperity should, in fact, result in less concern regarding the family size while the reduction in infantile mortality may merely result in natural increase in spacing between the births without affecting the fertility. The fear of loss of a child is related to the "desired" family size and not "reduced" family size and unless an awareness towards smaller family is evoked these factors may not influence the population growth rates.

From all considerations, it is apparent that although there are numerous social factors which interact with economic changes in indirectly invoking human behavioural responses, in the end it is the attitude towards life and an awareness of the social environments which determine the ultimate family size and future population trends.

The mechanism as to how the awareness towards family size is inculcated in a developed social order is of a complex nature and can only be extrapolated through objective analysis of the interactions between changing behaviours and economic evolution. The socio-economic factors which can be readily identified as major contributors to reduction in fertility rates are:

i. Prevalence of occupational circumstances conducive to postponement of marriage with the result that the most fertile period of female child-bearing age is reduced.

ii. Due to the change in the economic status of the child, who becomes first and foremost consumer, and other economic involvements of the urbanized life structure brought about by changes in the social status tend to invoke an awareness of the advantages of smaller families.

iii. The work participation of female population necessitates longer intervals between pregnancies.

iv. Increased involvement in social and professional occupancy tends to curtail the sexual activity thus reducing the chances of pregnancy.

v. Changes in the social and cultural environments reduce the socio-ethnic inhibitions against use of contraceptive techniques.

vi. Improved educational levels help develop an awareness of economic values, in preference over social values.

The development of the society is linked directly with the economic growth and in order to ensure improvement in development indices it is necessary that the productivity should be raised above the consumption to effect savings and investments. The favourable differential thus achieved is expected to trigger a spiraling phenomenon of demand and productivity improvements. The higher rate of growth in population in the developing countries, however, has been a constant constraint in generating momentum in the productivity pace, further aggravated by lower per capita productivity due to poor health conditions, particularly amongst the economically active segment. Adverse age-dependency ratios due to high birth rates and reduction in mortality, have worsened the situation further.

6. POPULATION PLANNING CONCEPT

Manpower planning is an integral component of economic development to attain efficient growth in productivity, to generate consumption and to ensure sufficient national savings for economic growth.

In determining the criteria upon which the population monitoring policies should be founded, there are certain vital factors which should be taken into account. The development levels essential to cater for the needs of a given population are subject to these factors, which together represent the total world resources:

a. Lands
b. Materials and Energy
c. Human employment

It is obvious that certain balance amongst these resources is essential for a healthy economic growth profile. Noteworthy, however, is the point that while excess of the resources over human employment have no adverse consequences but the reverse of this situation would be alarmingly undesirable.

In economic terms the above referred factors can be termed as:

i. Population supporting capacities of lands
ii. Industrial carrying capacity
iii. Human productive capability

Population supporting capacity of land is defined as food production capacity of land[7/] and consequently relates to the population which a given area of land can support. The food production capacities of different regions of the world are being assessed periodically and corrected according to the progress in agricultural technologies. Merely due to the fixed areas of land at the disposal of mankind, however, the food production will have an ultimate optimum limit and any attempts to exceed it would only produce minimal results. It has been estimated that in southern and eastern regions of Asia the population has already reached an optimum level which the arable lands of these regions can support.

7/ "Potential Population Supporting Capacities of land"; Food and Agriculture Organization contribution to World Population Trends and Policies, 1981 Monitoring Report, Volume 1 (population trends) p. 216

Industrial carrying capacity 8/ is ascribed to the capacity of the resources for industrial activity which is necessary to maintain economic development. Unlike food, where both the requirements and the production levels can be assessed relatively accurately, the assessment of industrial carrying capacities is subject to variables and uncertainties. Firstly, the quantities of industrial activity for required development levels faces the ever-changing and at times self-imposed needs of mankind. Secondly, and more important, is the measure of availability of material resources. With growing consumption of resources and in spite of the fact that newer resources have been discovered, it would be unrealistic to assume that the trend will continue and the resources will remain inexhaustible. On the contrary and although the "replacements" are being constantly discovered, it is clear that consumption of the natural resources in the required measure cannot be maintained indefinitely.

Human productive capabilities refer to the optimum industrial performance level of man. This "per capita productivity" has been continuously augmented through the industrial development age but it is evident that the improvements beyond the physical efficiency levels have been possible only at the expense of material and energy resources (mechanization, automation and computerization). Despite application of scientific knowledge for increasing efficiency in production in the highly industrialized economies, however, the recent years have recorded declining trends in per capita productivity after attaining an optimum level earlier, suggesting that human productive capacity also may reach its maximum in course of time:

Growth Rates of Output per Man Hour (USA)

1947-1966	=	2.83 per man hour
1966-1973	=	1.87 per man hour
1973-1978	=	1.02 per man hour
1979		-1.20 per man hour

when one considers that the balance between these three factors is necessary for healthy economic growth, it is obvious that those of food production and industrial carrying capacity having an ultimate limit, the population growth must be controlled to maintain a natural balance instead of leaving the forces of nature to "rectify the fault" on their own.

8/ "Industrial Carrying Capacity", UNIDO contribution to World Population Trends and Policies, 1981 Monitoring Report, Volume 1, (population trends), p.244

7. POPULATION POLICIES

Although the pressure of high population growth on economic development is increasingly realized in the recent years, the developing regions have yet to strengthen the role of population management in their development programmes. Recent data on population activities[9/] provide no such indicators for 71 out of 117 countries included. The 45 developing countries, excluding China, wherefrom the data is available, represent only 65 per cent population of the developing regions. Even in these countries the use of contraceptive measures is limited amongst about 30 per cent of women of 15-40 years of age, as compared with well over 60 per cent in most of the developed regions. Under these circumstances it is not surprising that the success achieved so far is far from encouraging and also reflects on the ineffectiveness of the measures employed in evolving the population policies. These measures can be classified in three distinct categories:

i. Voluntary measures. Such measures even when supported by promotional means invariably influence the middle class minorities only drawing hardly any response from economically depressed and rural population comprising over 75 per cent of the people. This tendency also results in widening of unhealthy economic gaps due to shrinkage in middle income population.

ii. Economic measures. Economic incentives encouraging smaller families appear more appealing in theory but in practice the chances of success are meagre because of the very nature of the measures which are either linked with public services often provided free of cost, or with tax redemptions when earning of the great majority of people remains "below tax" levels in any case.

The measures based on economic disincentives on the other hand, are generally considered punitive, and are feared to cause unrest and even resentment.

9/ Fertility and Status of Women, Population Reference Bureau Inc., Washington D.C. 1981

iii. Non-voluntary measures. These are obviously applied amongst the otherwise non-responsive population but can lead to repercussions which are not difficult to foresee. The experience in certain developing countries, India being one example, has amply demonstrated that such measures can hardly find provision in population policies unless based on coercive measures.

In view of the varied nature of socio-cultural attitudes, specific to different regions of the world, a policy based on any single standard model can not be applicable. The policies will have to be designed in harmony with the characteristics of each region separately in order to ensure effectiveness. The "final family size" being the focal point for success of any population programme, no quick result can, however, be expected as it requires sustained efforts and enduring patience to steer the socio-cultural behaviour in the planned direction. Such approaches need resources, methodology, capabilities and motivations where the developing countries face major problems. These deficiencies can be overcome only through substantive assistance and financial support at the global level if this apparently formidable goal is to be reached.

The activities of international agencies aiming towards the well being of the people of the world in relevant areas offer hope and can be extremely helpful in formulating national policies for population management. The role of specialized agencies of the United Nations is of significant relevance and can be availed beneficially. Although objectives of these agencies are specific, they all lead to the common goal - betterment of the people of the world.

The activities of UNIDO, based on the Plan of Action, under the mandate of the Lima Declaration, are being steered towards industrialization as a tool for overall economic development of the developing world.

These activities objectively provide encouragement to those sectors of industry which would permit accelerated rural development and wider distribution of earnings.

This approach is expected to bring about restructuring of the society and to help eliminate the undesirable economic and social disparities and would lead to improvements in the quality of life.

Amongst the activities specifically related to health and welfare, UNIDO is engaged in offering assistance in the development of pharmaceutical and related industries with the aim of enabling the developing countries to make the drug requirements for health programmes available economically and tailored to the needs.

Working in close coordination with the United Nations Fund for Population Activities, UNIDO is also engaged more directly in population activities by providing assistance to the developing countries for local production of contraceptives. During the course of the last few years, five such assistance programmes have been developed[10/] out of which three have already been executed. Earlier, a detailed study was prepared on "Raw Materials and Local Production of Contraceptives in Developing Countries"[11/] as a first contribution of UNIDO to world population activities.

10/ Survey of Contraceptives, Cuba (SI/CUB/75/804/C)

Establishment of a Condom Factory, Turkey (PF/TUR/78/001)

Consultancies on Development of Condoms, Vietnam (PF/DRV/78/001)

Assistance in the Production of Contraceptives, Bangladesh, (PF/BGD/79/001/D) (Uncommitted)

Assistance in the Family Planning Programmes, Production of Oral Contraceptives, Ghana (PF/GHA/78/001) (Uncommitted)

11/ UNIDO Publication No. PF/INT/75/015/11-12, 1975

8. UNIDO'S ACTIVITY IN THE SECTOR OF PHARMACEUTICAL INDUSTRY

Through products of the pharmaceutical industry namely drugs used in treating, preventing and diagnosing diseases, the development of a pharmaceutical industrial capability in the developing countries would have a direct effect on the population growth by reducing morbidity and mortality particularly in the early childhood. In this way, the development of the pharmaceutical industry in developing countries is in line with the recommendations of the World Population Plan of Action.

Since 1970 UNIDO has developed a large number of Technical Assistance in the pharmaceutical sector and has carried out these programmes creating an impact on the social and health programmes of the developing countries. The Technical Assistance Programmes have been developed in line with an industrial approach by designing and forming a group of products based on an economically mixed product approach to achieve economic viability. UNIDO gives assistance for the rationalization of the production through the new concept of a multipurpose plant for synthesis or through the extraction of medicinal plants. A list of Technical Assistance Programmes (missions and projects) carried out by the Pharmaceutical Industries Unit, Chemical Industries Branch, Division of Industrial Operations is given in Annex I and II. These projects have been implemented in accordance with the infrastructure and technological capability of the developing countries concerned and, therefore, the projects range from simple technology, such as oral rehydration salts production to a more sophisticated one such as the production of synthetic and fermentation based products.

Similarly to the above extensive programme for the production of therapeutics through technical assistance projects, studies and the system of consultation on the pharmaceutical industry (Annex III) UNIDO has launched a programme on preventive medicine, namely the industrial production of biologicals (IPB). The IPB programme is supplementing the Expanded Programme on Immunization (EPI) of WHO, which has already established the delivery system and created a market for vaccines in developing countries.

Summarizing UNIDO's activity in this industrial sector, has carried out up to now over 100 projects to establish public pharmaceutical industry in developing countries and to strengthen the already existing public sector in order to be much more self-sufficient both in managerial and technological aspects. UNIDO also conducted two consultation meetings for strengthening the position of developing countries when negotiating contractual arrangements and transfer of technology.

CONCLUSIONS AND RECOMMENDATIONS

The high population growth in the developing regions of the world during the last three decades is the consequence of marked decline in mortality in contrast to rather modest reduction in fertility rates, giving rise to a phenomenon of high differential between the births and mortality indices.

Recent movement of people from rural areas to urbanized nuclei in the developing regions is not expansion of urbanized soviety in the true sense and as such is devoid of the characteristics which are known to influence the demographic trends leading to reduction in population growth. During this very period the rural sector, comprising of a major part of population, was not given due attention in national development plans.

In contrast to the industrialized societies, the socio-economic behaviour of people of newly developed regions is characterized by deep rooted ethnic and traditional values, which have continued to persist and did not permit changes in the attitudes to bring about inhibitory effects on fertility trends.

The process of industrialization has affected a rather small segment of population in the developing regions, and as such the chances of it being of any significant value in steering the socio-cultural behaviour leading to reduction in population growth are limited.

It is evident that certain socio-economic changes, brought about through the process of development are vital to induce reduction in population growth rates. The developing countries, however, are engulfed in a vicious circle where this very aspect is constantly under pressure from population growth. Under such circumstances, an effective planning of population is a formidable task requiring large resources and extended pursuit.

Steady socio-economic evolution over a long period of time enabled the West to maintain effective checks on population growth but in the present day the world cannot afford long periods to bring about such structural changes in the developing societies. It therefore seems apparent that the population management policies must be parallelly supported by development programmes to effect the much needed structural changes in the life style.

Based on the above, it is recommended that :

- Attention should be given to improve the general educational level of people with emphasis on social behaviour, obligations towards society and economic implications of unrestricted population growth.

- Improvement in the living conditions in relation to food, housing, sanitation and health care facilities should be organized at the community levels. Mobilization of capabilities and utilization of resources within the communities are expected to augment the process of economic activities in the rural areas.

- The process of industrialization should be oriented towards primary and secondary industry sectors and well infused throughout the population in order to create economic activities and better distribution of national earning.

- The family planning programmes should be designed in harmony with the social characteristics of the communities and backed by family education and support services.

- The development of the domestic pharmaceutical industry should be encouraged because of its indirect effects on population growth through its impact on the social and health programmes in countries of the Third World.

ANNEX I

LIST OF UNIDO MISSIONS CARRIED OUT FOR COUNTRY PROFILES ON THE PHARMACEUTICAL INDUSTRY

	Prepared by
1. The Pharmaceutical Industry in ASEAN Countries: (a) Thailand (b) Indonesia (c) Philippines (d) Singapore (e) Malaysia	UN Asian and Pacific Development Institute in co-operation with UNIDO
2. Pharmaceuticals in the Developing World Policies on Drug, Trade and Production: Volume I - General Report Volume II - Country Profiles (a) Africa (b) Asia (c) Latin America	APEC TTI project
3. Production Plan for the Arab Pharmaceutical Industry in Selected Arab Countries: Volume I - General Aspects Volume II - Drugs and Pharmaceuticals Volume III - Medical Appliances	UNIDO/IOD.299 " " " "
4. Establishment of a Pharmaceutical Industry Sector in the East African Community.	
5. A Survey of Pakistan Pharmaceutical Industry	UNIDO experts
6. Development of the Pharmaceutical Industry in Afghanistan	UNIDO experts (SIS/AFG/77/804)

ANNEX II

LIST OF PROJECTS

1 - SOME LARGE SCALE PROJECTS UNDER IMPLEMENTATION

Title

Modernisation of Facilities for the Manufacture of Anti-Malarial Drugs

Techno-economic Feasibility Study for the Utilization of Medicinal and Aromatic Plants

Primary Health Support Services Programme

Strenghthening the Royal Drugs Research Laboratory

Processing of Medicinal Plants Cultivated and Collected in Nepal

Establishment of a Pilot Plant for Processing of Meat By-Products.

Pilot Plant for Baby Food Production

Assistance in the Production of Pharmaceuticals based on the Thai traditianal Pharmacopoeia

Pilot Production of Medicines Using Indigenous Raw Materials

Assistance au Development de la Production de Vaccins, d'Huiles Essentiales et de Produits Pharmaceutiques

Rehabilitation et Creation des Unites de Fabrication Locale des Medicaments

Creation of a Base for a Pharmaceutical Industry

Production de Medicaments a Base de Plantes Medicinales

Assistance for the Production of Plant Derived Pharmaceuticals

Assistance a la production de Produits Pharmaceutiques a partir de Plantes Medicinales

Assistance in the Establishment of a Pharmaceutical Plant in Zanzibar

Establishment of a Multipurpose Plant for the Production of Synthetic Drugs

Establishment of a Multipurpose Pilot Plant in Cuba for the Production of Synthetic Drugs

Centre for the Development of the Pharmaceutical Industry

Assistance to the Ministry of Industry for the Pharmaceutical Sector

Establishment of a Regional Research Centre for Biotechnology and Genetic Engineering

Establishment of a Centre for Biotechnology Applied to Pharmaceuticals

2 - FINALISED PROJECTS

Pilot Unit for the Production of Essential Oils

Establishment of a Unit for the Extraction of Active Ingredients from Medicinal Plants

Pilot Plant for the Production of Medicaments in the Cape Verde Islands

Assistance to the Central Analytical Laboratory

Assistance for the Establishment of a Central Quality Control Laboratory

	Production of Oral Rehydration Salts
	Intravenous Fluids Plants
	Establecimiento de una Planta Piloto de Hecogenina
	Establishment of a Regional Fermentation Programme for the Production of Antibiotics and other Pharmaceuticals in Latin America

3 - TRAINING PROGRAMMES

Belgium	Training Programme in Pharmaceutical Technology
Romania	In-plant Group Training Programme in Medicinal and Aromatic Plants in Romania
France	Industrial Pharmaceutical in-plant Group Training Programme

4 - SYMPOSIUMS AND TECHNICAL MEETINGS

India	UNIDO - Escap Workshop on the Essential Oils Industry
India	Technical Consultation on Production of Drugs from Medicinal Plants
Sweden	Seminar on National Self-Reliance in Blood and Blood Fractions for Developing Countries
China	Workshop on the Pharmaceutical Industry Combined Modern-Traditional Pharmacy for Promoting Technical Co-operation among Developing Countries
Cuba	Regional Seminar on the Industrial Application of Microbiology
Vienna	Panel Meeting of Industrial Experts on the Pharmaceutical Industry
Vienna	Ad-hoc Expert Group Meeting on Biomedical Equipment
Hungary	Technical Consultation on production of drugs in a multipurpose plant

5 - TCDC MEETINGS

Morocco	Meeting on Co-operation among Developing Countries
Mexico	Expert Group Meeting for the Establishment of a Regional Research Centre for Bio - technology for Central America.
Peru	Expert Group Meeting for the Establishment of a Regional Research Centre for Biotechnology and Genetic Engineering for South America.
India	Consultation Meeting on Transfer of Technology and Technical Know-how between Developing Countries in the Field of Pharmaceutical Industry

ANNEX III

SELECTED DOCUMENTATION RELATING TO PHARMACEUTICAL INDUSTRY

Papers issued for the Expert Working Group Meeting on the Establishment of Pharmaceuticals in Developing Countries, Budapest, Hungary, 5-9 May 1969

ID/WG.37/1	Patent aspects of the pharmaceutical industry
ID/WG.37/2	The pharmaceutical industries in the Second Development Decade
ID/WG.37/3	Establishment of pharmaceutical industries in developing countries: Report and proceedings of the Expert Working Group Meeting
ID/WG.37/4	UNIDO and the establishment of pharmaceutical industry secrors in developing countries
ID/WG.37/5	Quality contrcl in pharmaceutical manufacture
ID/WG.37/6	Therapeutic needs and production of drugs
ID/WG.37/7	FAO assistance to developing countries in the production of veterinary biologicals
ID/WG.37/8	Present regulatory statutes involving quality and efficacy in the export and import of pharmaceuticals in selected countries
ID/WG.37/9	The development and application of veterinary pharmaceuticals
ID/WG.37/10	How to conduct a realistic marketing, economic and financial study of the growth potential of a pharmaceutical industry in a developing country
ID/WG.37/11	Present regulatory statutes involving quality and efficacy in the export and import of pharmaceuticals in selected countries
ID/WG.37/12	Some conditions and prerequisites for establishing pharmaceutical industry in developing countries
ID/WG.37/13	The establishment of a pharmaceutical industry in a developing country - a case history
ID/WG.37/14	Pharmaceutical plant models and training centres
ID/WG.37/15	Active principles, drugs, pharmaceutcal intermediates and pharmaceutical preparations extraced or prepared from botanicals
ID/WG.37/16	Pharmaceutical industry in India
ID/WG.37/17	The importance of accurate drug information
ID/WG.37/18	Consideration of drug efficacy and safety

Papers issued for the Second Panel of Experts on the Pharmaceutical Industry, Vienna, Austria, 28 February-3 March 1978

ID/WG.267/4 Rev. 1	Report of the Second Panel of Experts on the Pharmaceutical Industry, Vienna, Austria
ID/WG.267/1	Guidelines for the preparation of a national list of drugs and national formulary
ID/WG.267/2	Ways of ensuring adequate supplies of chemical intermediates required for the production of drugs in developing countries
ID/WG.267/3	The steps involved in establishing a pharmaceutical industry in developing countries
ID/WG.267/5	Reports on drugs from the national drug list which because of their essentiality could be produced in the developing countries

Papers issued for the Technical Consultation on Production of Drugs from Medicinal Plants in Developing Countries, Lucknow, India, 13-20 March 1978

ID/WG.271/6	Report of the Technical Consultation on Production of Drugs from Medicinal Plants in Developing Countries, Lucknow, India, 1978
ID/WG.271/1	Plants of the African pharmacopoeias used in the treatment of tropical diseases
ID/WG.271/2	Industrial requirements for processing medicinal plants
ID/WG.271/3 Corr. 1	An integrated approach to research on medicinal plants
ID/WG.271/4	Medicinal plants for curing diseases other than communicable, tropical and infectious

Papers issued for the Regional Seminar on Industrial Application of Microbiology in Pharmaceutical Industry, Cuba, 2-9 July 1979

ID/WG.300/1	Future trends in industrial applications of microbiology in pharmaceutical industry
ID/WG.300/2	Microorganisms and their role in the fermentation processes including biosynthesis of antibiotics
ID/WG.300/3	Technology for the production of tetracyclines and erythromycin
ID/WG.300/4	Estado actual de la tecnología de producción fermentativa de sustancias naturates
ID/WG.300/5 Rev. 1	The fermentation process and production of Gentamicin C. An aminoglycoside antibiotic complex
ID/WG.300/6	Ampicillin - detailed description of raw materials used, production process, yields at different stages and cost of production. Technology for manufacture of 6 amino penicillanic acid
ID/WG.300/7	Brief description of the manufacturing processes of antibiotics
ID/WG.300/8	The latest state of technology in the production of natural substances by fermentation
ID/WG.300/9	Erythromycin production in the pharmaceutical industry
ID/WG.300/10	Algunas características de la industria químicofarmaceútica en los países del grupo andino
ID/WG.300/11	Production of oxidative fermentation including acetic acid
ID/WG.300/12	Antibiotics consumption and manufacturing facilities in Latin America, strategy and policies
ID/WG.300/13	Draft report - Regional seminar on industrial application of microbiology

Papers issued for the Pharmaceutical Meeting on the Production of Essential Drugs in Developing Countries, Budapest, Hungary, 16-23 September 1979

ID/WG.304/1	Analgesics and/or anti-inflammatory agents
ID/WG.304/2	Antidepressant drugs
ID/WG.304/3	Antibiotics
ID/WG.304/4	Prevention and treatment of infectious diseases by immunization
ID/WG.304/5	Vitamins
ID/WG.304/6	Antituberculotics
ID/WG.304/7	Antimalarial agents

Documents: First Consultation on Pharmaceutical Industry 1980, Meetings of Committee of Experts on Pharmaceuticals and Ad Hoc Panel of Experts 1981/1982

ID/WG.292/3	Report of meeting on pharmaceutical industry, 1979
ID/WG.304/4	Prevention and treatment of infectious diseases by immunization, 1979
IOD.254	International consultation meeting in the field of establishment and development of pharmaceutical industries, 1979
ID/222	Report of the technical consultation on production of drugs from medicinal plants in developing countries, Lucknow, 1978
ICIS.146	Assessment of the pharmaceutical industry 1978-2000. A report for the global preparatory meeting on pharmaceuticals, 1980
IOD.336	Draft report, meeting on production of essential drugs, 1979
ID/WG.317/2	Preliminary draft of the main clauses to be considered in drafting a licensing agreement on the pharmaceutical industry, 1980
ID/WG.317/1	Issues that might be considered at the first consultation on pharmaceutical industry, 1980
ID/WG.317/3	Draft report, meeting on pharmaceutical industry, 1980
ID/WG.331/9	Provisional list of documents, meeting on pharmaceutical industry, 1980
ID/WG.331/3	Preparation of guidelines, background paper, pharmaceutical industry, 1980
ID/WG.331/8	Illustrative list of drugs prepared by UNIDO in consultation with WHO, 1980
ID/WG.331/2	Relevant issues to be taken into account when negotiating transfer agreements, 1980
ID/WG.331/4	The pricing and availability of intermediates and bulk drugs, 1980
ID/WG.331/5	The availability, terms and conditions for the transfer of technology for the manufacture of essential drugs, 1980
ID/WG.331/6	Global study of the pharmaceutical industry, 1980
ID/259	First consultation on the pharmaceutical industry report, 1980
UNIDO/PC.14	Background paper for discussion on availability, pricing and technology of essential drugs, 1981 .
ID/WG.267/1	Guidelines for the preparation of a national list of drugs and national formulary, 1978
ID/WG.267/2	Ways of ensuring adequate supplies of chemical intermediates required for the production of drugs in developing countries, 1978
IOD.336	Draft report, meeting on production of essential drugs, 1979
ID/222	Plants in developing countries, Lucknow, India, 1978. Report of the technical consultation on production of drugs from medicinal plants in developing countries, Lucknow, 1978
PC/R.4	Turn-key arrangements for the transfer of technology for the production of bulk drugs (draft), 1980
ID/WG.385/3	Contractual arrangements for the setting up of a plant for the production of bulk drugs or intermediates, 1982
UNIDO/PC.14	Background paper for discussion on availability, pricing and technology of essential drugs, 1981

ID/WG.385/1	Arrangements for the transfer of technology for the manufacture of bulk drugs and intermediates, 1982
PC.52	Availability, pricing and technology of essential drugs and their intermediates, 1982
PC.51	Directory of sources of supply of 26 essential bulk drugs, their chemical intermediates and some raw materials, 1982
ID/WG.385/2	Arrangements for the transfer of technology for the formulation of pharmaceutical forms. Contractual conditions and background notes, 1982

Documents on the Second Consultation on the Pharmaceutical Industry, Budapest, Hungary 21 to 25 November 1983

ID/WG.393/5	Progress report
ID/WG.393/6	Contractual arrangements for the production of drugs - issue paper
ID/WG.393/1	Items which could be incorporated in contractual arrangements for the transfer of technology for the manufacture of those bulk drugs/intermediates included in UNIDO's illustrative list
ID/WG.393/4	Items which could be included in contractual arrangements for the setting up of a plant for the production of bulk drugs (or intermediates) included in UNIDO illustrative list
ID/WG.393/3	Items which could be included in licensing arrangements for the transfer of technology for the formulation of pharmaceutical dosage forms
ID/WG.393/7	Contractual arrangements for the production of drugs - background paper
ID/WG.393/8	Availability, pricing and transfer of technology for bulk drugs and their intermediates - issue paper
ID/WG.393/9	Availability, pricing and transfer of technology for bulk drugs and their intermediates - background paper
ID/WG.393/10	The development of drugs based on medicinal plants - issue paper
ID/WG.393/11	The development of drugs based on medicinal plants - background paper
ID/WG.393/12	The manufacture of vaccines in developing countries - issue paper
ID/WG.393/13	The manufacture of vaccines in developing countries - background paper
ID/WG.393/14	Relevant topics to be taken into account in the preparatory phase technology transfer arrangements for the production of pharmaceuticals

ID/WG.393/15	Summary of industrial property protection on pharmaceuticals in developing countries
ID/WG.393/16	Multipurpose plant for the production of UNIDO's List of Essential Drugs based on raw materials and intermediates
ID/WG.393/2	Directory of Sources of Supply of 26 Essential Drugs, their chemical intermediates and some raw materials
UNIDO/IS.388	Water use and effluent in the pharmaceutical industry
UNIDO/IS.389	Prospects for production of vaccines and other immunizing agents in developing countries
ID/WG.393/17	The need of drug policies
ID/WG.393/18	Industrial profiles of pharmaceutical production units for formulations and bulk drugs

Papers presented at the Workshop on the Pharmaceutical Industry (Combined modern-traditional Pharmacy) for Promoting Technical Co-operation among the Developing Countries.

Beijing and Hangzhou 1 - 14 November 1982

1. An Introduction to Chinese Materia Medica.
2. Basic Concepts of Chinese Traditional Medicine.
3. Clinical Application of Traditional and Herbal Drugs.
4. A Resumé of the Goals and Philosophies underlying UNIDO's programmes in the Industrial Utilisation of Medicinal and Aromatic Plants in Developing Countries.
5. Modern Research on Chinese Traditional and Herbal Drugs.
6. Chinese Traditional Dosage Forms and their Modernisation.
7. Industrial Developments in the Production of Chinese Traditional and Herbal Remedies.
8. Standardisation of Chinese Materia Medica.

Papers on miscellaneous subjects - Pharmaceutical Industry

ID/WG.37/11	Present regulatory statutes involving quality and efficacy in the export and import of pharmaceuticals in selected countries, 1970
IIS file no. 8431	Bleaching of beeswax - Industrial Inquiry Service
IIS file no. 8229	Gelatine capsules - Industrial Inquiry Service
IIS file no. 8435	Pharmaceutical adhesive plaster - Industrial Inquiry Service
IIS file no. 7724	Quinine - Industrial Inquiry Service
UNIDO/ID/68	Manual on the establishment of industrial joint venture agreement in developing countries
UNIDO/ID/98	Guidelines for acquisition of foreign technology
UNIDO/ID/264	The growth of the pharmaceutical industry in developing countries
ID/CON.3/14	Report on implications of activities of UNIDO - UN World Population Conference
UNFPA/WPPA/4	The world population plan of action. Some implications and practical measures for it
UNFPA/WPPA/8	Guidelines for implementation of world population. Plan of action in less developed countries
UC/INT/75/015	Effects of industrialization on population
UNIDO/IO.384	Population, economics, development and industrialization
UNIDO/IOD/338	Biomedical equipment, Expert Group Report, 1979
UNIDO/IO/R53	Biomedical engineering in developing countries, 1983

Papers on some selected st .s in the Pharmaceutical Industry

UNIDO/ITD.346	International contraceptive study project on raw materials and local production of contraceptives in developing countries, 1975
UNIDO/ID/162	Information sources on the pharmaceutical industry. UNIDO guides to information sources, No. 20, 1976
UNIDO/IOD.76	Basic principles for the transfer of technology for the establishment of a pharmaceutical industry in developing countries, 1977
UNIDO/EX.24	Report of panel on pharmaceutical industry, 1977
ID/WG.267/1	Guidelines for the preparation of a national list of drugs and national formulary, 1978
ID/WG.267/2	Ways of ensuring adequate supplies of chemical intermediates required for the production of drugs in developing countries, 1978
ID/WG.271/1	Plants of the African pharmacopoeias used in the treatment of tropical diseases, 1978
ID/WG.271/2	Industrial requirements for processing medicinal plants, 1978
ID/WG.267/3	The steps involved in establishing a pharmaceutical industry in developing countries, 1978
ID/WG.271/3	An integrated approach to research on medicinal plants, 1978
ID/WG.271/4	Medicinal plants for curing diseases other than communicable, tropical and infectious, 1978
ID/WG.267/4/Rev.1	Report on meeting on pharmaceutical industry, 1978
UNIDO/ICIS.74	Summary of the draft world-wide study of the pharmaceutical industry, preliminary draft, 1978
ID/WG.267/5	Reports on drugs from the national drug list which because of their essentiality could be produced in the developing countries, 1978
ID/204	The growth of the pharmaceutical industry in developing countries: problems and prospects, 1978
UNIDO/IOD.207	Note on UNIDO activities relating to pharmaceutical products in the context of primary health programmes, 1978
ID/208	Manufacture of Tetracycline and Oxytetracycline (in technologies from developing countries), 1978
ID/WG.282/65	Production of Ethambutol (in technologies from developing countries), 1978
	Coconut water as intravenous fluid (as above)
	Ergotoxine strain of ergot (as above)
	Methaqualone and methaqualone hydrochloride (as above)
	Oil from shark liver (as above)

ID/WG.292/2	The pharmaceutical industry in developing countries, its potential, and the national and international action required to promote its development, 1978
ID/WG.282/79	Appropriate technology in drug and pharmaceutical industries, background paper, 1978
ID/WG.282/45	Provision of drugs by appropriate technology, 1978
ID/WG.282/93	Choice and adaptation of appropriate technology in production of drugs and pharmaceuticals in developing countries, 1978
UNIDO/IO.502	Workshop on the essential oil industry, 1981- UC/INT/81/068
UNIDO/IOD.13	Effects of industrialization on population
UNIDO/EX.100	Assessing the availability of raw materials for the basic production of 20 essential drugs, 1979
UNIDO/IOD.334	Programme of pharmaceutical activity for the quinquennium 1980/85
UNIDO/IO.380	Report on meeting on veterinary drugs, 1980
ID/WG.282/68	Medicine for the rural population in India, 1978
ID/B/26	Group 4: chemicals, pharmaceuticals and other related industries (IDB 2nd session - in programme of work of UNIDO for 1969, part 2), 1968
ID/WG.383/2/Add.4	Application of genetic engineering and biotechnology for the production of improved human and animal vaccines with particular reference to tropical diseases, 1982
UNIDO/IO.505	Medicinal and aromatic plants for industrial development. A review of UNIDO activities on the utilization of medicinal and aromatic plants for the production of pharmaceuticals in developing countries, 1982
UNIDO/IS.273	The potential of genetic manipulation for the improvement of vaccines against animal diseases in developing countries, 1981
UNIDO/IOD.207	UNIDO role in the development of pharmaceutical industry in developing countries
UNIDO/EX.100	Study on availability of raw materials and intermediates for basic production of essential drugs _US/INT/78/077
UNIDO/ICIS.146	Assessment of pharmaceutical industry, 1978
UNIDO/IO.507	Technical consultation on production of drugs in multipurpose plant, 1982